IN THE UNITED STATES BANKRUPTCY COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
CORPUS CHRISTI DIVISION

In re:	§	**Case No. 05-21207**
	§	
ASARCO LLC, *et al.*,	§	**Chapter 11**
	§	
Debtors.	§	**(Jointly Administered)**
	§	

Expert Name: **Richard Lane White**

Retention on behalf of: **ASARCO, LLC**

PROFFER OF DIRECT TESTIMONY OF RICHARD LANE WHITE

Introduction

The following information is a true and accurate statement of my testimony if I were called as a witness in open court in this case.

A. Brief Summary of Opinions

I was retained by Debtor-in-Possession ASARCO LLC ("ASARCO") to develop a cost share for ASARCO at the Omaha Lead Site ("OLS") using probabilistic modeling. The following are the major opinions that I offer in this proceeding:

- Probabilistic modeling is an appropriate and widely accepted method for estimating future environmental liabilities and is appropriately used for evaluating and estimating ASARCO LLC's liability at the OLS.
- ASARCO should be assigned a "share" of cost responsibility, taking into account that other potentially responsible parties ("PRPs") also bear a share of responsibility.
- ASARCO's cost share was developed for each of three boundary scenarios. ASARCO's weighted direct share for the OLS is 22.32%
- ASARCO's assigned direct cost at the OLS is $4.8 million.
- I have performed a sensitivity analysis to compare the volumetric scenarios presented in the expert reports of Dr. Medine, Ms. Forslund, and Mr. Steen. That sensitivity analysis shows ASARCO's assigned direct cost at the OLS is well below $10 million, even under those volumetric scenarios, which ASARCO disputes.

B. Expert Qualifications

I am a director at LECG, an international economic and management consulting firm, and am a member of LECG's environmental and insurance coverage practice. I have a B.A. from Willamette University (economics, political science and history) and a Masters Degree in Public Policy from Harvard University. One of my primary areas of expertise is in the broad area of Superfund cost analysis, including cost allocation. I have been approved by the United States Environmental Protection Agency (USEPA) as a qualified candidate allocator for EPA's Allocation Pilot Program, which was a project sponsored by EPA to conduct and monitor the

Superfund cost allocation process at selected sites throughout the county. Complete copies of my resume and my Civil Rule 26(A) (2)(B) disclosure are contained in Appendix A-2 of the Expert Report of Jeffrey Zelikson and Richard Lane White dated May 4, 2007 ("Overview Report").

C. Statement of Opinions

1. I estimated ASARCO LLC's (ASARCO) share of the total response costs at the Omaha Lead Site (OLS) using probabilistic cost analysis. My colleague Jeffrey Zelikson and I used probabilistic cost analysis to evaluate and estimate environmental liabilities because this task involves consideration of many areas of uncertainty. My opinions are set out in more detail in the Overview Report, the Supplemental Expert Report of Jeffrey Zelikson and Richard Lane White on Behalf of ASARCO LLC, May 11, 2007, Appendix B-3, Omaha Lead Site ("the Opening Report") and the Rebuttal Expert Report of Jeffrey Zelikson and Richard Lane White On Behalf of ASARCO LLC, July 9, 2007 ("the Rebuttal Report').

Methodology for Analyses

2. Probabilistic cost analyses are used in a wide variety of other environmental contexts, ranging from estimating environmental contingent liabilities in commercial transactions to insurance recovery for future environmental liabilities. EPA has used probabilistic analysis in assessing risk presented by environmental conditions for nearly a decade.[1]

3. Probabilistic modeling for evaluating environmental liabilities is the generally-recognized standard, as shown by ASTM International (formerly the American Society for Testing and Materials) "Standard Guide for Estimating Monetary Costs and Liabilities for Environmental Matters (ASTM E2137-01 and ASTM E2137-06). Short of certainty, probabilistic modeling and development of an expected value is the ASTM Standard's preferred

methodology for estimating environmental obligations in the future. [2] As ASTM notes, it provides the most robust (i.e., durable) and comprehensive estimate, with the greatest quantification of uncertainty. Indeed, the Government's expert, Gayle S. Koch, states in her rebuttal report that the "decision analysis technique for estimating future environmental costs is, as cited by LECG, a technique supported by the relevant ASTM International Standard".[3] Her criticism is that LECG somehow "misapplies" the technique to estimate OLS costs. [4] A review of Ms. Koch's report reveals that she simply disagrees with LECG's inputs into the model (e.g. scenarios and probabilities) largely because they are issues that she chose to ignore in her analysis.

4. Probabilistic modeling, or "the decision-tree approach," is a tool specifically designed to examine and evaluate a wide range of uncertainty. It delineates major issues and their influence on final outcomes and results in an estimate that takes into account all potential remedial actions that may be required for each specific remedial problem.

5. Probabilistic modeling methodology generally follows the following steps: 1) assess extent of contamination; 2) identify future clean up alternatives; 3) calculate the capital and operating costs of each alternative; 4) estimate the probability of occurrence (use) of the alternative; 5) combine the cost and probability estimates; and 6) determine liability share.

6. These steps are captured through the use of a decision tree. A decision tree is simply a graphical representation that captures the key issues needed to evaluate the uncertainty and probabilistically evaluate the range of potential outcomes. It shows, as a diagram, the different remedial actions that may be taken to address each specific environmental issue at a site. For each action, it shows the probability that the action will occur (or be taken), and can be designed to illustrate the costs related to each of the specific activities.[5] A decision tree for the

OLS is attached hereto and as Exhibit D-11 to the proffer of Jeffrey Zelikson.

7. One of the most useful descriptive statistics applicable to any group of data or outcomes is the average, or what we refer to as the mean or expected value (EV). Probabilistic cost analysis is designed to provide this average - the expected value. It provides much more, including the range of potential outcomes, but it is the expected value that best reflects what we "expect" a given future environmental liability to cost.

8. More complicated decision trees can be evaluated with simulation models. A simulation is simply the selection of a possible path (i.e., a specific result) through the decision tree, and then repeating this process literally thousands of times over. Each of these thousands of repeated runs is based on a computer generated random sampling. When we examine the results of all these repeated runs we can derive the expected value and the range of possible outcomes - exactly the same information we seek to obtain when we enumerate the model. In statistical terms, this repeated sampling methodology is called "Monte Carlo" sampling. It is a routinely and widely applied sampling procedure used to evaluate large modeling or data issues. In the environmental context, ASTM specifically identified this method, noting: "other approaches to estimating an expected value may include simulation modeling and Monte Carlo analysis, for example, to estimate cost distributions."[6] This is the methodology we employed for evaluating ASARCO's future environmental liabilities at the OLS.

9. In preparing our analysis, we considered inflation, base year and discount rates in order to estimate a present value of OLS claims for the Court's consideration. We disagree with the Government's experts on the appropriate factors to be applied to account for inflation and for discount rates for response costs. The following is a brief discussion of the areas and bases for disagreement.

10. **Inflation.** Costs are frequently estimated as of a particular time period - a base year. For example, at the OLS, EPA expects to be conducting response actions for a number of years, and we needed to forecast future response costs over that time period based on response costs today – in 2006 dollars. Even if the scope of ongoing response costs remains constant over the next several years, actual costs – costs actually incurred - will rise over time at the rate of inflation on an annual basis. We refer to these "as incurred" costs as nominal costs – costs adjusted to reflect inflation. Nominal costs represent the actual amount a party will incur when it "writes the check" to pay these costs. Tracking costs on a nominal basis better represents actual future cash flows. Moreover, since costs may be provided for different components that have been estimated from differing base years (i.e., some in 2006, but some in 2003 dollars, for example), converting costs to a consistent base year is also necessary. Our estimate of future inflation is 2.3%.[7]

11. **Base Year.** For purposes of our analyses we have used 2006 as our "base year" because that is the year that ASARCO and its related subsidiaries filed bankruptcy, and we assumed that claims would be filed using 2006 dollars. Future costs are assumed to occur on a mid-year basis (a common adjustment made to accurately adjust future cash flows that occur equally over the year). In contrast, the Government's experts (M. Alexis Maniatis and Gayle Koch) have used June 30, 2008 as their base year. This use is unsupported and has the result of increasing – and thereby potentially overstates – discounted costs.

12. **Discount Rate - Response Costs**. Another necessary component of our analysis is to convert future cash flows into their equivalent value today - which again we measure as of July 2006. Discounting converts future cash flows to their discounted equivalent or present value, by use of a discount rate. The government has, almost without exception for the last

twenty years, employed a 7.0% real discount rate at Superfund sites, consistent with U.S. Office of Management and Budget (OMB) guidance adopted by EPA. EPA's Guide to Developing Cost Estimates notes that: "Based on the NCP and this (OMB) directive, a discount rate of 7% should be used in developing present value cost estimates for remedial action alternatives during the [Feasibility Study]. This specified rate of 7% represents a 'real' discount rate ... and has been adjusted to eliminate the effect of expected inflation." The fact that this is a "real" (i.e., net of inflation) rate means that their rate corresponds to a 9.46% nominal rate (a rate inclusive of inflation where inflation is 2.3%).

13. We opted to employ an identical discount rate - 7.0% real (9.46% nominal) for converting future remedial costs to July 2006 equivalents. This required escalating some cost estimates as they were presented in earlier year dollars. Such estimates were inflated to July 2006 constant dollars. These constant dollar estimates were then present valued based upon the expected timing of the remediation expenditures using a 7.0% real discount rate as described above. For historical dollar conversions we used the applicable historical inflation rate.

14. The Governments' experts, at the direction of the Department of Justice, determined "the annual discount factors and the interest rate to be applied to the estimated remediation costs to establish a single present value amount that would have to be paid to . . . the Hazardous Substance Superfund Trust Fund (the Superfund Trust Fund) today to fund these costs over approximately the next century."[8] The approach directed by the Department does not evaluate ASARCO's NPV cost responsibility. Cost responsibility was measured by the USEPA in its interim ROD at a 7% real discount rate. The position taken by the Department of Justice is inconsistent with EPA's practice in preparing cost estimates for feasibility studies as well as those used in the Interim Record of Decision for the OLS. The Governments' analysis has the

effect of dramatically increasing the amount of the claim before the Court in this estimation proceeding.

ASARCO Cost Share Analysis

15. My colleague Jeffrey Zelikson used the probabilistic modeling methodology described above to arrive at the expected net present value of the final remedy costs, using three different boundary scenarios as described in his proffered direct testimony and our opening report.[9] I then estimated ASARCO's cost share using the following methodology.

16. There are two fundamental, and somewhat overlapping, cost share estimation issues: divisibility and equitable allocation. This Court will ultimately rule on the issue of whether ASARCO's contributions at the OLS are capable of reasonable apportionment and therefore "divisible." Because this is a legal question, I limited my opinion to an evaluation of key factual characteristics of ASARCO's waste contributions. In my experience there are three basic factual questions that directly relate to the question of divisibility: 1) Are the activities of the parties at the site similar in nature? 2) Are the waste streams of the various parties similar? 3) Is there a reasonable basis to develop a quantification of the contributions of the various parties?

17. The Court will ultimately rule on whether ASARCO's waste contributions are geographically divisible from other areas of the Site as well. This issue is a subject addressed by William Walker's analysis.

18. Divisibility is thought of as a first order question because if divisibility applies then some of the key allocation issues become irrelevant. It is ASARCO's legal position that the harm is divisible and liability is several. It is also ASARCO's legal position that the Government is a PRP at this site and as such is not entitled to joint and several liability. We do not express an opinion on that legal issue, but are aware that the United States has asserted joint and several liability against ASARCO at the OLS.

19. As explained below, there are a number of potential sources of industrial lead. The ASARCO facility was one of the smelter/refining operations, but there are also other historic smelting and refining facilities, such as Carter White Lead and Gould, which were each generating air emissions containing lead. It is my opinion that there exists a reasonable and supportable basis to quantify the relative contributions of the parties - whether used to evaluate divisibility, or as a key component in examining allocation criteria. Should this Court conclude that these facts are sufficient to establish divisibility, the share ASARCO should be assigned is, in our opinion, the weighted "direct share" we have calculated - which is 22.32%.

20. Independent of divisibility, ASARCO has another basis for limiting its exposure to joint and several liability by means of evaluating its cost allocation share. Allocation typically occurs among potentially responsible parties (PRPs) at multi-party sites, and invariably occurs at some stage in the cleanup process. As a result, the natural "starting point" for any examination of allocation is to examine how it is done among PRPs. CERCLA identifies four classes of liable parties: arrangers (or generators), transporters, owners and operators. For allocation purposes what is required is a showing that there is a release, or a threat of a release, at a site, which has created the need for response. I am not offering any legal opinions in my analysis but I am evaluating each of these issues from the perspective of an allocation consultant.

Identified Potentially Responsible Parties

21. Not only are there other PRPs at the OLS, but the United States itself is a PRP. The ASARCO facility was a 23-acre site located at 500 Douglas Street in downtown Omaha on the banks of the Missouri River. The facility was originally built in 1870 and operated from 1871through 1997. The historical record indicates that Union Pacific Railroad Company (UP) owned the property occupied by the refinery from at least 1886 until 1946, when it was sold to

ASARCO. During World War I, the United States seized UP and the federal government controlled all of its railroad operations and properties. In World War II, the federal government through the Metal Reserve Corporation (MRC) was involved in the overall control of the industry and the toll processing of certain ores, including lead, at the ASARCO facility during one of the peak production periods at the plant.[10]

22. The Governments' experts have also chosen to completely overlook the federal government's status as a PRP. During World War I, the federal government was a landowner of the Omaha plant site. During World War II, the MRC exercised substantial control over the operations of the Omaha plant including what products were produced, the level of production, the price of the products, and the sale and transportation of both raw materials and plant products. Finally, it seems as though the opposing experts (at least Drs. Medine and Drexler) have ignored the potential contribution of industrial PRPs, even though those PRPs are identified in their report.

23. I consider the Carter White Lead Company to be a PRP for the purposes of my analysis because it operated pyrometallurgical facilities in the OLS beginning in 1886 when the industrialist Levi Carter established the Carter White Lead Company in Omaha. Carter operated in two locations in proximity to the ASARCO facility and the OLS. The first facility operated from 1878 to 1890, was located at 20th Street and the Union Pacific Railroad. The replacement facility was located at 21st Street and Locust from approximately 1890 to 1936. Plant operations included the use of the "Carter Process" to manufacture white lead. In 1906 Carter White Lead became a subsidiary of National Lead and its Omaha plant was closed. The current-day corporate successor to National Lead is N.L. Industries.[11]

24. I also consider Aaron Ferer & Sons, Co. (Ferer) to be a PRP at the OLS because it operated a secondary lead smelting facility and lead battery recycling plant from the early 1950s to approximately 1963 on the property subsequently used by Gould Electronics (Gould) located on Farnam Street, adjacent to the ASARCO facility.[12] Gould is a PRP at the OLS for the purposes of this analysis because its operations succeeded Ferer's operations at the Farnam Street facility. According to EPA, Gould purchased the Ferer plant in Omaha in 1963 and operated on the site until 1982. EPA notes that the blast furnace used to smelt the lead at the Gould Omaha plant emitted lead particles into the air.[13]

25. The City of Omaha owned about 4.4 acres of the approximately 19.65 acres occupied by the Omaha plant including portions of public streets, alleys, and areas along the riverbank. The City was not just a passive municipal landowner – it charged rent for the facility to occupy its land, authorized the dumping of slag on city-owned land, and insisted on retaining ownership when slag was used to expand the banks of the Missouri River. It also is a PRP.[14]

The Allocation Process

26. The objective of cost allocation is to equitably allocate costs among various responsible parties. The remedy, which is designed to address the impact of wastes at the site, is the "cost" that is the subject of the cost allocation process; it is what is being divided among the responsible parties. Many of the equitable factors that are employed to evaluate the allocation are themselves directly measurable proxies for cost. As a general matter, wastes give rise to costs; and parties are related to wastes. A key step in the allocation process is to quantify the sources of contamination (waste) and then apportion the site's costs among those wastes. Costs for each waste stream should then be allocated among the parties related to those waste streams. Our analysis focuses on these cost-related questions.

27. In order to equitably allocate costs at the OLS, two key issues must be addressed: (1) the site boundary and (2) the source(s) of contamination. The "remedy" at the OLS is the clean up of primarily residential properties where lead levels are above a predetermined action level. As a result, the OLS, as defined by USEPA, has no "boundary." Were lead sources limited to smelter and refinery emissions (pyrometallurgical), the boundary should have been defined on a block-by-block basis to determine the reasonable boundary for lead deposition from air emissions.

28. However, EPA's own work shows that most of the lead at this boundary-less site is not, however, from those smelting and refining emissions. Using EPA's own Allocation Study[15] solely for the purposes of this analysis, approximately 62% of the total lead identified is attributed to sources other than "pyrometallurgical sources." Moreover, it appears that this 62% of total lead derives from sources beyond the sphere of Superfund liability such as lead paint, emissions from leaded gasoline and other anthropogenic sources. Many of the homes cleaned up, or considered for future cleanup, fall outside the geographical area within which the smelter and refinery sources could reasonably be a contributor; those homes are contaminated by sources that appear to be beyond the sphere of Superfund liability. We view EPA's failure to recognize this issue as a central and critical deficiency.

29. When apportioning responsibility it is important to examine all anthropogenic and pyrometallurgical sources of lead emissions and their potential contribution to the overall presence of lead in the OLS. While it appears that the opposing experts have focused almost exclusively on ASARCO's Omaha lead refinery as the primary source of all lead at the OLS, no single source, examined in isolation, can fairly account for the varied concentrations of lead found in soils. The geographical distribution of lead in the OLS simply does not support a sole-

source theory of emissions for the OLS. It does not appear that the EPA, or any other entity has conducted air modeling to determine the fate and transport of lead particles from all of the other potential anthropogenic sources that could affect the OLS. Even when examining the alleged contribution of the Omaha plant to the OLS, the opposing experts rely on incomplete and unreliable data as the basis for their assumptions thereby rendering their conclusions invalid and/or highly biased. For example, the opposing experts make no allowance for the fact that throughout its operating life the primary product of the Omaha plant was lead in various forms. Any lead emissions from the plant represented a loss of a valuable, saleable product and would have been controlled as soon as recovery technology was available to improve the plant's productivity. Finally, the opposing experts have repeatedly used inconsistent terminology in describing the plant over its operating life, sometimes referring to it as a smelter, and at other times as a refinery. These distinctions have important implications for any alleged emissions from the plant as the emissions profile for a smelter is quite different from that of a refinery. The facts, as documented in ASARCO's response to the USEPA request for information under CERCLA Section 104(e) are that "by 1906 primary lead smelting operations appear to have ceased," after which date the facility operated primarily as a refinery for lead, copper (until sometime during 1924-1934 when this process ceased), and bismuth (1915-c.1997).[16]

30. To address this deficiency, we have "defined" the Site boundary such that it properly reflects the area where smelter and refinery (pyrometallurgical) emissions could have been a source of contamination at a level sufficient to require clean up. For this boundary as defined by ASARCO's expert William Walker we develop a cost share analysis (Scenario 1). This boundary relates specifically to ASARCO and Gould (and related party) operations. The Site boundary for allocation Scenario 1 matches up with Boundary 1 as defined and discussed in

Mr. Zelikson's proffer. Alternatively, we have developed calculations (Scenario 2) that match up with Boundary 2 as discussed in Mr. Zelikson's proffer. We recognize, however, that the Court may choose to apply a cost share to the EPA's undefined site. Scenario 3 is designed to provide a cost share for that larger site area, but it explicitly takes into account the fact that much of the broader area lacks contamination from smelting and refining sources. Scenario 3 matches up with Boundary 3 or the undefined site as discussed in Mr. Zelikson's proffer.

31. **Scenario 1 (Table 5(A))**. The analysis presented in Table 5A, attached hereto as Exhibit D-18, examines Scenario 1/Site Boundary 1 where the site is defined so as to include only the area potentially impacted by historic smelting and refining emissions from ASARCO and Gould. (Boundary 2 is illustrated in Exhibit D-12.) Although Carter White is a similar historical lead industry, it is not identified in either Scenario 1 or Scenario 2 because its facilities were not located within the geographical area encompassed by either Boundary 1 or Boundary 2. In Section 1 of the table individual operating periods are identified. Shares are developed based on operating period. Shares are then apportioned as between owner and operator related to each period. I used an 80% operator share and a 20% owner share because, in my professional experience as a Superfund allocator, that is the ratio between owners and operators typically applied through settlement or litigation outcomes. In Section 2 a weighting is applied to distinguish between pyrometallurgical and other sources. This breakdown is based on a speciation study prepared for EPA by Dr. John Drexler.[17] In Section 3 the operating periods – as weighted by pyrometallurgical share – are presented. The pyrometallurgical production share, as a group, is assigned a 38% weight; 62% is assigned to the other (beyond the scope of Superfund) activities / sources. In Section 4 the results from section 3 are broken out as between operator related to a period and owner related to a period. In addition, ASARCO's cost shares are

calculated. ASARCO's direct share as an owner or operator is 69.96% within boundary 1. ASARCO's share inclusive of orphan share adjustment is 79.36% within boundary 1 (although this calculation is designed to reflect ASARCO's potential maximum share given that most of the incremental shares are related to solvent parties (e.g., Union Pacific, City of Omaha, U.S. Government)). ASARCO's orphan share, including its share for any non-pyrometallurgical sources is also 79.36% within boundary 1. It is assumed that within boundary 1 all sources are pyromettalurical which is a conservative assumption on my part.

32. **Scenario 2 (Table 6A)**. Table 6A, attached hereto as Exhibit D-18, examines Scenario 2 - where the site boundary is defined using the results of EPA's 1999 air modeling, and includes homes contaminated by all sources, not just pyrometallurigal sources. It is not as large as the area EPA is currently investigating. (Boundary 2 is illustrated in Exhibit D-12.) Again, in Section 1 individual operating periods are identified and shares are developed based on those periods. Shares are then apportioned between owner and operator related to each period. In Section 2 a breakdown is provided between the industrial operations (pyrometallurgical production) and the other lead sources that are beyond the scope of Superfund liability. In Section 3 the operating periods – as weighted by pyrometallurgical share – are presented. In Section 4 the results from section 3 are broken out as between operator related to a period and owner related to a period. In addition, ASARCO's cost shares are calculated. ASARCO's direct share as an owner or operator is 26.58% within boundary 2. ASARCO's share inclusive of orphan share adjustment is 30.16% within boundary 2 (although this calculation is designed to reflect ASARCO's potential maximum share given that most of the incremental shares are related to solvent parties (e.g., Union Pacific, City of Omaha, U.S. Government). ASARCO's orphan share, including its share for any non-pyrometallurgical sources is 79.36% within

boundary 2 (this calculation assumes that the USEPA could force PRPs to pay for the cleanup of contaminants that EPA itself cannot pursue directly).

33. **Scenario 3 (Table 7A)**. Table 7A, attached hereto as Exhibit D-18, examines Scenario 3 – the current undefined site boundary that includes homes contaminated by pyrometallurigal sources, and other unidentified industrial sources as well as those contaminated by sources beyond the scope of Superfund liability. Carter White is now included among the parties who are assigned a share. In Section 1 individual operating periods are identified, developed based on operating period and apportioned between owner and operator. In Section 2 a breakdown is provided between the industrial operations (pyrometallurgical production) and the other lead sources that are beyond the scope of Superfund liability. The 38% pyrometallurgical production share/ 62% non-pyrometallurgical share is then applied. In Section 3 the operating periods – as weighted by pyrometallurgical share – are presented. In Section 4 the results from section 3 are broken out as between operator related to a period and owner related to a period. In addition, ASARCO's cost shares are calculated. ASARCO's direct share as an owner or operator is 19.42% within boundary 3. ASARCO's share inclusive of orphan share adjustment is 22.03% within boundary 3 (although this calculation is designed to reflect ASARCO's potential maximum share given that most of the incremental shares are related to solvent parties (e.g., Union Pacific, City of Omaha, U.S. Government). ASARCO's orphan share, including its share for any non-pyrometallurgical sources is 57.97% within boundary 3 (this calculation assumes that the USEPA could force PRPs to pay for the cleanup of contaminants that EPA itself cannot pursue directly).

The Allocation Results

34. The allocation to ASARCO is presented in Table 1a, attached hereto as Exhibit D-13. ASARCO's direct share of costs is $4.8 million and is based on a weighted average of the costs and associated allocation shares derived for each of the 3 boundary scenarios. ASARCO's direct share represents 22.32% of the estimated site cost of $21.5 million NPV. ASARCO's orphan-adjusted share of costs is $5.4 million, representing 25.32% of our estimated NPV site cost. ASARCO's orphan share adjusted, plus share of non-pyrometallurgical component cost is $13.5 million, representing 62.5% of site cost.

35. I have reviewed the expert reports provided by Union Pacific, Gould, and the United States that attempt to recreate historic emissions from the ASARCO and Gould facilities, and conclude that there is not enough reliable information to divide responsibility among PRPs on the basis of relative volume. The rebuttal reports make it very clear that there is very incomplete data on historical production and emissions, and that there are a variety of viewpoints on how to use very few data points to come up with wildly different answers, particularly with regard to the early years of operations. In contrast, using relative periods of operation, as I have done, is based on one of the only sets of information about which there will be no disagreement on the data points. In my opinion, given the lack of consistent information about different technologies and different production operations at the ASARCO facility over 125 years, periods of operation looking at the geographical scope of potential impact from emissions are the best available surrogate for measuring relative responsibility across the parties.

36. However, in light of the controversy among experts on this point, I performed a sensitivity analysis to compare the volumetric scenarios presented in the expert reports of Medine (U.S.), Forslund (Gould) and Steen (UP). I substituted their emissions data for my time-

based shares. In this analysis I left in place the cost analysis performed by my colleague Jeffrey Zelikson, as well as the boundaries, and the pyrometallurigcal shares calculated by Dr. Drexler. While my direct share calculation is $4.8 million for ASARCO, employing the Medine data would result in a $6.8 million direct result for ASARCO. Employing the Forslund data would result in a $6.9 million result for ASARCO, and employing the Steen data would result in a $6.0 million result for ASARCO. For orphan-adjusted shares I calculate $5.4 million to ASARCO. Employing the Medine data would result in $8.5 million for ASARCO. Employing the Forslund data would result in $8.6 million for ASARCO, and emplying the Steen data would result in $7.1 million for ASARCO. Finally, I estimate $13.5 million to ASARCO for its orphan share adjusted plus share of non-pyrometallurgical share result. Employing the Medine data would result in $21.3 million to ASARCO. Employing the Forslund data would result in $21.5 million to ASARCO, and employing the Steen data would result in $17.5 million to ASARCO. All of these results, as well as the site costs associated with each scenario, are presented in Exhibit D-18.

D. Exhibits to be Introduced in Support of Direct Testimony:

Copies of the demonstrative exhibits offered as part of my direct testimony are listed and attached hereto.

D-11	Omaha Lead Site Response Cost Analysis (Decision Tree)
D-12	Omaha Lead Site Schematic, Site Boundaries and Number of Properties with at least One Non-Drip Zone Sample Exceeding 400 ppm Lead by Zip Code
D-13	Summary of Analysis
D-18	Omaha Allocation Tables

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct. Executed this 1st day of August, 2007 at Seattle, WA.

Richard Lane White

[1] Expert Report of Jeffrey Zelikson and Richard Lane White On Behalf of ASARCO LLC, May 4, 2007 ("Overview Report") at 27-28.
[2] Overview Report at 29-30.
[3] Expert Rebuttal Report Concerning Future Costs at the Omaha Lead Superfund Site in the ASARCO LLC Chapter 11 Bankruptcy Matter, Case No. 05-21207, July 9, 2007 ("Koch Rebuttal Report") at 1.
[4] *Id.*
[5] For a summary of the ASTM Guidance illustration of the probabilistic modeling process in a typical environmental case, please see our Overview Report at pages 31–34.
[6] Overview Report at 35 n.68.
[7] We use 2.25% as our future inflation rate in accordance with the future inflation rate found in the USEPA BEN model Plant Cost Index (PCI). The BEN model was developed by USEPA to "calculate the economic benefit a violator derives from delaying and/or avoiding compliance with environmental statutes." (See BEN User's Manual, September 1999). The default cost index in the BEN model is the PCI, which is published by Chemical Engineering, and which tracks plant equipment costs. In the BEN Model, USEPA uses the historical PCI values through December 2006; for dates beyond December 2006 (through December 2029) they use a forecasted PCI value. This value is based on the average of the OMB and CBO forecasts for the CPI; for 2008 through 2029, this average is 2.25%. Overview Report at 35-36.
[8] Expert Report Concerning Estimation of the Present Value of Expected Remediation Costs in the ASARCO LLC Chapter 11 Bankruptcy Matter, Case No. 05-21207, May 4, 2007 at 2.
[9] Supplemental Expert Report of Jeffrey Zelikson and Richard Lane White on Behalf of ASARCO LLC, May 11, 2007, Appendix B-3, Omaha Lead Site ("OLS Opening Report") at 16-49.
[10] OLS Opening Report at 2-3, 54-55; Rebuttal Report at 3-5.
[11] OLS Opening Report at 56-57.
[12] *Id.* at 57-58.
[13] *Id.* at 57-59.
[14] Rebuttal Report at 3.
[15] John Drexler, A Study on the Source of Anomalous Lead Concentrations in Soils from the Omaha Community – Omaha, Nebraska, Sept. 22, 2002.
[16] *Id.* at 4.
[17] *Id.*

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